Design and fabrication of a controlled atmosphere storage unit to improve the shelf life of Apple

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Abstract

Food preservation is given a high priority worldwide wide when ensuring food security. Most of raw food items need to be transported before processing and therefore food preservation needs to be carried out during the long-distance transportation that may take several weeks. Currently, long distance food storage spaces are only temperature controlled and hence freshness of the food cannot be maintained properly over a significant span of weeks. According to research done, shelf life can be improved significantly by increasing carbon dioxide concentration and decreasing oxygen concentration of atmospheric air of the storing environment. This controlled atmosphere storage technology (CAS) has been successfully employed in larger scale enclosed storing units to improve the shelf life of foods, but this technology has not been developed to be used for smaller scale storing spaces. In this research project small scale-CAS unit was developed which has the capability to control and monitor temperature, humidity, gas concentration and gas pressure individually. Developed control and monitoring systems are based on Arduino embedded systems. Initially atmospheric gas will be vacuumed from the system after storing the food inside the storage cabin. Then oxygen and carbon dioxide will be supplied to the storage cabin until favorable concentrations for food preservation are achieved while maintaining the temperature constant. These parameters will be kept constant throughout storage time after adjusting these parameters to the desired favorable conditions, Finally, at the end of the storing time inside gas mixture at the storing unit will be released to the environment by absorbing CO_2 using wet scrubber. Developed device is portable, low cost and have high effectiveness over the existing products.

Keywords: *Arduino platform, Controlling method, Controlled Atmosphere, Food preservation*